AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A semiconductor laser module comprising:

an optical wavelength conversion element comprising:

a ferroelectric crystal substrate, and

a transverse electric (TE) mode optical waveguide which extends along the ferroelectric crystal substrate surface, said optical waveguide having a polarization direction parallel to the ferroelectric crystal substrate, and said optical waveguide further having a periodic domain inversion portion, where a spontaneous polarization direction of the ferroelectric crystal substrate is inverted, and the optical wavelength conversion element converts a wavelength of a fundamental wave which propagates in the optical waveguide in a direction along which the domain inversion portions are aligned; and

a semiconductor laser which can emit a laser beam in the TE mode in which a laser polarization direction is parallel to the ferroelectric crystal substrate and which can adjust a center wavelength of stimulated emission of the laser beam, and light emitted from the semiconductor laser is made to enter the optical waveguide,

wherein said optical wavelength conversion element and said semiconductor laser are mounted such that the polarization directions of the TE mode of the waveguide and laser coincide with each other and a light exit portion of the semiconductor laser and a light entrance portion of the optical wavelength conversion element coincide with each other,

wherein the spontaneous polarization direction of said substrate forms a predetermined angle with respect to the substrate surface in a plane perpendicular to a propagation direction of the fundamental wave, and

wherein the light exit portion of said semiconductor laser and the light entrance portion of said optical wavelength conversion element are bonded together with a thin film insulator interposed therebetween.

2. (Cancelled).

3. (currently amended): A semiconductor laser module according to claim ~~2~~1, wherein said predetermined angle is larger than 0° and smaller than 20°.

4. (currently amended): A semiconductor laser module according to claim ~~2~~1, wherein said predetermined angle is larger than 0.2°.

5. (currently amended): A semiconductor laser module according to claim ~~2~~1, wherein said optical waveguide is formed by proton exchange and annealing, and said predetermined angle is larger than 0.5°.

6. (currently amended): A semiconductor laser module according to claim ~~2~~1, wherein said predetermined angle is smaller than 20°.

7. (Original): A semiconductor laser module according to claim 1, wherein said semiconductor laser makes the center wavelength of stimulated emission of the laser beam coincide with a phase matching wavelength of the optical wavelength conversion element.

8. (Original): A semiconductor laser module according to claim 1, wherein said semiconductor laser includes a substrate, and said substrate of said semiconductor laser and said ferroelectric crystal substrate of said optical wavelength conversion element are directly bonded.

9. (currently amended): A semiconductor laser module according to claim 1, wherein ~~said semiconductor laser and said optical wavelength conversion element are bonded together with an SiO_2 thin film interposed therebetween~~ the thin film insulator is an SiO_2 thin film.

10. (currently amended): A semiconductor laser module according to claim ~~9~~1, wherein a thickness of ~~said SiO_2~~the thin film insulator is 0.5 to 3 μm.

11. (Original): A semiconductor laser module according to claim 1, wherein said optical wavelength conversion element converts a wavelength of said fundamental wave to a wavelength of a second harmonic of said fundamental wave.

12. (currently amended): A method for forming a semiconductor laser module, comprising the steps of:

forming an optical wavelength conversion element including a ferroelectric crystal

substrate, and

a transverse electric (TE) mode optical waveguide which extends along the ferroelectric crystal substrate surface, said optical waveguide having a waveguide polarization direction parallel to the ferroelectric crystal substrate, and a domain inversion portion, where a spontaneous polarization direction of the ferroelectric crystal substrate is inverted, is periodically formed in the optical waveguide, and the optical wavelength conversion element converts a wavelength of a fundamental wave which propagates in the optical waveguide in a direction along which the domain inversion portions are aligned, wherein in a plane perpendicular to a propagation direction of the fundamental wave, the spontaneous polarization direction of the substrate forms a predetermined angle with respect to the substrate surface;

forming a semiconductor laser which can emit a laser beam in the TE mode in which a laser polarization direction is parallel to the ferroelectric crystal substrate, and which can adjust a center wavelength of stimulated emission of the laser beam, and light emitted from the semiconductor laser is made to enter the optical waveguide; ~~and~~

mounting said formed optical wavelength conversion element and said formed semiconductor laser such that the polarization directions of the TE mode of the waveguide and laser coincide with each other and a light exit portion of the semiconductor laser and a light entrance portion of the optical wavelength conversion element are made to coincide with each other;

forming an optical wavelength conversion element holder which has a reference surface for light entry and is able to fix said optical wavelength conversion element such that a plane of light entry of said optical wavelength conversion element includes said reference surface for

light entry;

forming a semiconductor laser holder which has a reference surface for light exiting and is able to fix said semiconductor laser such that a light exiting surface of said semiconductor laser includes said reference surface for light exiting;

fixing said optical wavelength conversion element to said optical wavelength conversion element holder, and fixing said semiconductor laser to said semiconductor laser holder; and

mounting said optical wavelength conversion element and said semiconductor laser such that the reference surface for light entry of said optical wavelength conversion element holder and the reference surface for light exiting of said semiconductor laser holder are joined.

13. (Original): A method for forming a semiconductor laser module according to claim 12, further comprising the steps of:

forming a substrate for fixing on which said optical wavelength conversion element and said semiconductor laser are mounted, the substrate for fixing having a flat surface and a stepped surface with a predetermined step which is parallel to said plane; and

mounting the optical wavelength conversion element to said flat surface of said substrate for fixing, and mounting the semiconductor laser to the stepped surface of said substrate for fixing.

14. (Original): A method for forming a semiconductor laser module according to claim 13, wherein said step can accommodate at least the semiconductor laser, and corresponds to a difference between a distance from an upper surface of the semiconductor laser to the light exit

position of a laser beam and a distance from an upper surface of the optical wavelength conversion element to the optical waveguide.

15. (canceled):

16. (currently amended): The semiconductor laser module of claim ~~2~~1, wherein the predetermined angle is defined as θ, and wherein

$d = L\tan\theta$,

where d is a depth of domain inversion and L is a length of a domain inversion region.

17. (currently amended): The semiconductor laser module of claim ~~2~~1, wherein the predetermined angle is defined as θ, and wherein

$d = L\tan\theta + C$,

where d is a depth of domain inversion and L is a length of a domain inversion region, and C is a spreading constant for domain inversion.

18. (previously presented): The semiconductor laser module of claim 16, wherein a width ratio of a domain inversion region to a domain non-inversion region is 1:1.

19. (currently amended): The ~~method according to~~module of claim 1, wherein a top surface of the substrate is disposed with a first electrode and a bottom surface of the substrate is

disposed with a second electrode, wherein the first and second electrodes are offset from each other such that the electrodes do not overlap, said electrodes used to form the domain inversion regions.

20. (previously presented): The module of claim 1, wherein the polarization directions of the laser and waveguide are each parallel to a ferroelectric crystal substrate.

21. (previously presented): The method of claim 12, wherein the polarization directions of the laser and waveguide are each parallel to a ferroelectric crystal substrate.

22. (new): A semiconductor laser module comprising:

an optical wavelength conversion element;

a semiconductor laser;

a semiconductor laser holder which is fixed to the semiconductor laser; and

an optical wavelength conversion element holder which is fixed to the optical wavelength conversion element,

wherein the optical wavelength conversion element comprises:

a ferroelectric crystal substrate, and

a transverse electric (TE) mode optical waveguide which extends along the ferroelectric crystal substrate surface, said optical waveguide having a polarization direction parallel to the ferroelectric crystal substrate, and said optical waveguide further having a periodic domain inversion portion, where a spontaneous polarization direction of the ferroelectric crystal substrate

is inverted, and the optical wavelength conversion element converts a wavelength of a fundamental wave which propagates in the optical waveguide in a direction along which the domain inversion portions are aligned;

wherein the semiconductor laser can emit a laser beam in the TE mode in which a laser polarization direction is parallel to the ferroelectric crystal substrate and can adjust a center wavelength of stimulated emission of the laser beam,

wherein light emitted from the semiconductor laser is made to enter the optical waveguide conversion element,

wherein the optical wavelength conversion element and the semiconductor laser are mounted such that the polarization directions of the TE mode of the waveguide and laser coincide with each other and a light exit portion of the semiconductor laser and a light entrance portion of the optical wavelength conversion element coincide with each other,

wherein the spontaneous polarization direction of said substrate forms a predetermined angle with respect to the substrate surface in a plane perpendicular to a propagation direction of the fundamental wave, and

wherein the semiconductor laser holder and the optical wavelength conversion holder are disposed such that the light exit portion of the semiconductor laser is joined to the light entrance portion of the optical wavelength conversion element.

23. (new): The semiconductor laser module of claim 1, wherein the semiconductor laser and the optical wavelength conversion element are disposed junction-down (upside-down) on a substrate.

24. (new): The semiconductor laser module of claim 22, wherein the semiconductor laser holder comprises a heat sink which accepts the semiconductor laser for mounting thereon.

25. (new): The semiconductor laser module of claim 22, wherein the semiconductor laser holder and the optical wavelength conversion element holder are fixed together by an adhesive.

26. (new): The semiconductor laser module of claim 22, wherein the semiconductor laser holder and the optical wavelength conversion element holder are fixed together by YAG laser welding.

27. (new): The semiconductor laser module of claim 22, comprising:

a stand which accepts the semiconductor laser holder and the optical wavelength conversion element holder for mounting thereon; and

a collimating lens for adjusting the output of the optical wavelength conversion element and disposed on the stand.